

Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) ~~A differential~~ An interferometric confocal microscope for measuring an object, said microscope comprising:
a source-side pinhole array;
a detector-side pinhole array; and
an interferometer that images the array of pinholes of the source-side pinhole array onto a first array of spots located in front of an object plane located near where the object is positioned and onto a second array of spots behind the object plane, wherein the first and second arrays of spots are displaced from each other in both a direction normal to the object plane and a direction parallel to the object plane, said interferometer also imaging the first arrays of spots onto a first image plane that is behind the detector-side pinhole array and imaging the second array of spots onto a second image plane that is in front of the detector-side pinhole array wherein each spot of the imaged first array of spots is aligned with a corresponding different spot of the imaged second array of spots and a corresponding different pinhole of the detector-side pinhole array.

2. (Currently Amended) A differential interferometric confocal microscope for measuring an object, said microscope comprising:
a source-side pinhole array;
a detector-side pinhole array; and
an interferometer that images each pinhole of the source-side pinhole array onto a corresponding different pair of two locations, one of which lies in a first object plane and the other of which lies in a second object plane that is parallel to and displaced from the first object plane, thereby generating a first image of the source-side pinhole array in the first object plane and a second image of the source-side pinhole array in the second object plane, said

interferometer also projecting a first array of return measurement beams from the first image and a second array of return measurement beams from the second image toward the detector-side pinhole array to produce a first array of converging beams and a second array of converging beams, wherein the detector-side pinhole array generates an array of ~~conjugated quadratures of~~ fields each of which ~~that~~ is a difference of ~~conjugated quadratures of~~ fields of the first and second arrays of converging beams.

3. (Currently Amended) A differential interferometric confocal microscope for measuring an object and which has, in the vicinity of where the object being measured is to be located, a first object plane and a second object plane that is displaced from and parallel to the first object plane, said microscope comprising:

a source-side pinhole array;

a detector-side pinhole array; and

an interferometer that receives a beam from a selected pinhole of the source-side pinhole array and converges a first part of that received beam onto a corresponding first location in the first object plane and a second part of that received beam onto a corresponding second location in the second object plane, said interferometer also arranged to receive a first return beam from the first location and a second return beam from the second location and converge at least a part of each of the first and second return beams onto a corresponding pinhole of the detector-side pinhole array to produce a difference of ~~conjugated quadratures of~~ fields of the first and second return beams converging on that corresponding pinhole,

wherein said selected pinhole is any pinhole of the source-side pinhole array.

4. (Currently Amended) ~~A differential~~ An interferometric confocal microscope for measuring an object, said microscope comprising:

a source-side pinhole array for producing an array of input beams;

a detector-side pinhole array; and

an interferometer including:

a first optical element providing a first reflecting surface;

a second optical element providing a second reflecting surface; and

a beam splitter positioned between the first and second optical elements,

wherein the beam splitter produces from the array of input beams a first array of measurement beams and a second array of measurement beams,

wherein the first reflecting surface participates in focusing the first array of measurement beams onto a first array of locations on a first object plane in object space and the second reflecting surface participates in focusing the second array of measurement beams onto a second array of locations on a second object plane in object space, said first and second object planes being parallel to and displaced from each other,

wherein the first array of measurement beams generates a first array of return beams from the object and the second array of measurement beams generates a second array of return beams from the object,

wherein the first reflecting element participates in producing from the first array of return beams a first array of converging beams that converge to a first array of spots on a first image plane and the second reflecting element participates in producing from the second array of return beams a second array of converging beams that converge onto a second array of spots on a second image plane, said first and second image planes being adjacent to and on opposite sides of the detector-side pinhole array, and

wherein the detector-side pinhole array combines the first and second arrays of converging beams to form an array of output beams.

5. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 4 wherein a single pinhole array serves as both the source-side pinhole array and the detector-side pinhole array.

6. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 5, wherein the first optical element is located between said single pinhole array and the beam splitter and wherein the second optical element is located between a location at which the object is positioned during use and the beam splitter, wherein the first reflecting surface has a center of curvature for which there is a corresponding conjugate as viewed through the beam splitter, and wherein the second reflecting surface has a center of curvature that is displaced relative to the corresponding conjugate of the center of curvature of the first reflecting surface.

7. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 6, wherein the conjugate of the center of curvature of the first reflecting surface and the center of curvature of the second reflecting surface are displaced from each other in a first direction that is normal to a plane defined by the beam splitter and in a second direction that is parallel to the plane defined by the beam splitter.

8. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 7, wherein the first reflecting surface participates in focusing the first array of measurement beams via the beam splitter onto the first array of locations and the second reflecting surface participates in focusing the second array of measurement beams via the beam splitter onto the second array of locations.

9. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 8, wherein the first reflecting element participates in combination with the beam splitter in producing the first array of converging beams and the second reflecting element participates in combination with the beam splitter in producing the second array of converging beams.

10. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 9 wherein the first reflecting surface is substantially concentric with a point on the object.

11. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 9, wherein the second optical element provides a refracting surface positioned between the object and the beam splitter to receive light rays from the object.

12. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 11, wherein the first reflecting surface substantially conforms to a sphere having a first radius and the refracting surface conforms to a sphere having a second radius, wherein the first radius is greater than the second radius.

13. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 9, wherein the first optical element provides a refracting surface positioned between the beam splitter and said single pinhole array.

14. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 9 wherein the second reflecting surface is substantially concentric with an image point on said single pinhole array.

15. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 13, wherein the second reflecting surface substantially conforms to a sphere having a first radius and the refracting surface conforms to a sphere having a second radius, wherein the first radius is greater than the second radius.

16. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 9, wherein said single pinhole array is a two-dimensional array.

17. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 16, wherein the two-dimensional array is of equally-spaced holes.

18. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 17, wherein the equally-spaced holes are circular apertures.

19. (Currently Amended) The ~~differential~~ interferometric confocal microscope of claim 9, wherein the first and second object planes are separated from each other on the order of the longitudinal resolution of the ~~differential~~ confocal interferometric microscope.

20. (New) The interferometric confocal microscope of claim 7, wherein the conjugate of the center of curvature of the first reflecting surface and the center of curvature of the second reflecting surface are displaced by an amount that causes the detector-side pinhole array to generate an array of fields each of which is a difference of fields of corresponding beams of the first and second arrays of return measurement beams.

21. (New) The interferometric confocal microscope of claim 7, wherein the conjugate of the center of curvature of the first reflecting surface and the center of curvature of the second reflecting surface are displaced by an amount that causes the interferometric confocal microscope to operate in a differential mode.